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## Is there More to Food Insecurity among Children than Poverty? The Importance of Measurement

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The Importance of Measurement**

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**Is there More to Food Insecurity among Children than Poverty?  
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## **Abstract**

This paper examines the association between poverty and food insecurity among children using the official measure of poverty and the new supplemental poverty measure of the Census Bureau based on a more inclusive definition of family resources and needs. Our objective is to study whether the association between food insecurity and poverty improves with a more comprehensive measure of income and needs. We find a strong and statistically significant association between income-to-needs ratio based on the official poverty metric and food insecurity among children—particularly very low food security among children. A more inclusive measure of income-to-needs-ratio, based on the supplemental poverty measure strengthens the association. These findings remain robust in models using longitudinal data with person fixed effects.

A growing body of research demonstrates the negative consequences of food insecurity on children's health and developmental outcomes including cognitive development and school achievement (Alaimo et al. 2001; Hernandez and Jacknowitz 2009; Howard 2011; Jyoti et al. 2005; Rose-Jacobs et al. 2008; Winicki and Jemison 2003), socio-emotional development (Alaimo et al. 2001, 2002; Casey et al. 2005; Dunifon and Kowaleski-Jones 2003; Huang et al. 2010; Jyoti et al. 2005; Weinreb et al. 2002; Whitaker et al. 2006), and overall health. In addition, research suggests that the presence of food insecurity among children exacerbates the risks to children that are posed by overall household food insecurity (Cook et al. 2006).

The U.S. government has set a goal of eliminating very low food security among children by 2015. To achieve this goal, it is important to understand the causes of food insecurity, and the role that policy can play in reducing it. While prior research has examined the causes and consequences of food insecurity, the measure of poverty used is limited and for the most part very low food security among children is ignored. The purpose of this paper is to study the determinants of food insecurity among children, with a specific focus on income and poverty.

Using data from the CPS-FSS and the CPS Annual Social and Economic Supplement (ASEC), this paper examines the association between poverty and food insecurity among children using the official measure of poverty and the new supplemental poverty measure of the Census Bureau, which is more inclusive and captures a wider range of resources and needs. Specifically, this paper addresses the following questions: 1) How strongly is poverty associated with food insecurity among children; and 2) To what extent does this relationship change with the improved supplemental measure of poverty?

## **Food Insecurity and Previous Research**

The prevalence and severity of food insecurity in the United States is tracked in the Current Population Survey Food Security Supplement (CPS-FSS), which is administered in December. Food insecurity among children is defined as the lack of consistent access to adequate food. Very low food security among children refers to households in which children suffer disrupted meal patterns and food intake that is less than the amount their caregivers consider adequate (Nord 2009). As of December 2010, approximately 10 percent of the 39.4 million households with children experienced food insecurity, which was a notable rise after remaining between 8 and 9.5 percent for nearly a decade (Coleman-Jensen et al. 2011). One percent of all households with children in 2010 experienced very low food security (Coleman-Jensen et al. 2011).

There is a wide body of research documenting the determinants of food insecurity. One of the largest contributors is low income. (For a summary of findings, see Gundersen, Kreider, and Pepper (2011)) When income is constrained or limited, households may be forced to make difficult decisions that can result in a less than adequate supply of food. This is perhaps best illustrated in Edin and Lein's (1997) qualitative research *Making Ends Meet*, which documents how some of the poor urban mothers chose to go without food rather than forgo other essentials such as medical care.

In 2010, 24 percent of households with income below the official poverty threshold reported food insecurity among children compared with only seven percent of non-poor households, according to the CPS-FSS. Nearly three percent of poor households with children reported very low food security among children versus less than one percent of non-poor households (Coleman-Jensen et al. 2011). A similar link has been reported in data from the 1988–1994 Third National Health and Nutrition Examination Survey (NHANES III), the Child Development Survey of the PSID, multiple years of data from the Survey of Income and

Program Participation (SIPP), and the 1989–1991 Continuing Survey of Food Intake by Individuals (CSFII)(Alaimo et al. 1998; Connell et al. 2001; Dunifon and Kowaleski-Jones 2003; Gundersen et al. 2011; Rose et al. 1998).

However, despite research indicating that hunger and food insecurity are correlated with low income, various national surveys, (e.g. SIPP, CPS-FSS, CSFII) also show that close to half of all families reporting food insecurity have incomes above the poverty line(Gundersen et al. 2011).One of the limitations of prior studies in this area is their reliance often on inadequate measures of household income and poverty(Gundersen et al. 2011). In particular, the official measure of poverty has been criticized for missing key components of both income and essential needs of families.

Family income, on which the official poverty index is based, is not an all-inclusive measure of the resources that households command. The official measure of income does not, for instance, include all the cash and non-cash benefits a household might receive. These benefits often constitute a non-trivial component of the incomes of families in poverty. Importantly for this paper, the official poverty measure does not adjust for assistance under the SNAP/Food Stamps Program or other food and nutrition assistance programs (such as school breakfasts, school lunches, and WIC). A small body of literature finds that programs such as SNAP, the National School Lunch Program (NSLP), and the School Breakfast Program are associated with reductions in food insecurity(Bartfeld and Ahn 2011; Gundersen et al. 2012; Mykerezzi and Mills 2010; Ratcliffe et al. 2011). Thus, families in poverty that receive benefits under SNAP (or other food and nutrition assistance programs) may be less food insecure than similarly placed non-poor families, with incomes marginally above the poverty line, that are not eligible for SNAP (and other programs).

The official poverty index also does not take into account work-related expenses, out-of-pocket medical care costs, and geographic differences in living expenses including housing. Nor does it differentiate between types of housing, which affect available family resources (Citro and Michael 1995). For instance, families with subsidized housing but incomes below the official poverty index are likely to be better placed in terms of resources available to spend on food than families marginally above the poverty line but without subsidized housing. Similarly, families in poor health may be spending more on medical care than families in better health, and are therefore likely to be left with fewer resources to allocate on food.

While prior research has examined the links between poverty and food insecurity, the official poverty estimates on which these studies were based did not fully capture the needs of the poor and the resources available to them. For instance, people with low levels of income, but who are not living in poverty, still experience high levels of material hardship, such as food- and housing-related hardships, and many of the people experiencing hardships have incomes that are above the official poverty line (Boushey et al. 2001; Fremstad 2010). At the same time, some families whose incomes are below the official poverty line may have other resources (not counted in the official measure) that would help buffer them from food insecurity. However, very few studies have examined the question of whether a more comprehensive measure of income and poverty is more strongly correlated with material hardship, in general, and food insecurity among children, more specifically.

Using two surveys of Chicago residents, Mayer and Jencks (1988) found that family income explained only about 14 percent of the variation in the number of material hardships reported and that using broader measures of economic resources, such as noncash benefits, home ownership, and access to credit, explained only a little more. Redefining family income is only



one part of the equation. Work by Meyers et al. (2000) suggests that improving the poverty threshold is also important for understanding the relationship between poverty and hardship. Using data from the New York Social Indicator Survey (NYSIS), which is a repeated cross-sectional survey of a random sample of families in New York City, Meyers et al. (2000) found that a more comprehensive measure of resources and equivalence scales as well as an updated poverty threshold strengthens the association between poverty and hardship.

## **Research Methods**

### *Data*

This analysis uses data from the 2001–2009 CPS-FSS, fielded in December, to examine the determinants of food insecurity and very low food security among children with a focus on the role of income and poverty. We restrict our analysis to these years because the month the food security module was fielded varied before 2001. The sample, which is based on the December CPS-FSS (N=243,113), is restricted to children less than 18 and excludes children who are emancipated minors (i.e., the household reference person living alone, with others, or married to the household reference person) and children whose household food security status is unknown because the reference person did not give a valid response to any of the questions in the food security scale. Observations with no income data were dropped from the analysis (about 9 percent). In work not reported here we compared samples with and without those missing on income and the samples appear to be relatively similar.

Measures of food insecurity among children are based on a set of 18 questions fielded in the Food Security Supplement of the Current Population Survey. (See Appendix Table A.1 for a complete list of the 18 questions.) Using the USDA's guidelines, households are defined as food

insecure if they respond affirmatively to at least three of the 18 questions. Children's food security status in the household is based on responses to questions 11 through 18, which ask the main respondent in the household to report on the food security of children. Using the USDA's guidelines, households reporting between two and four indicators of food insecurity are classified as having *low food security among children*, and households responding affirmatively on five or more questions are classified as having *very low food security among children*. The classification *food insecurity among children* includes both categories.

We study three outcomes relating to food security. The first is a dichotomous measure coded 1 for children in households reporting food insecurity among children, and zero for all others. The second outcome is also a dichotomous variable coded 1 for children in households with very low food security among children and zero for all others. The third is a multinomial outcome in which children are assigned to one of five mutually exclusive categories based on the householder's response to the 18 questions: *No Food Insecurity*; *Marginal Food Security among Adults*, *No Child Food Insecurity* (defined as households reporting at least one food insecure condition among adults, but none among children); *Marginal Food Security among Children* (defined as households reporting one food insecure condition among children); *Low Food Security among Children* (defined as households reporting between two and four food insecure conditions among children); and *Very Low Food Security among Children* (defined as households reporting five or more food insecure conditions among children). The choice to use these measures of food insecurity is based on the USDA's guidelines and prior research in the field (Bartfeld and Ahn 2011; Coleman-Jensen et al. 2011).

The Annual Social and Economic (ASEC) Supplement (March CPS) 2002-2010 data are used to construct the two measures of poverty, official and supplemental, for each year. We first

use the official Census Bureau poverty thresholds to construct an income-to-needs ratio for each family. Because family income in the December CPS-FSS is only available in categories, we impute a continuous measure of income into the December CPS using a regression based method that estimates continuous income separately by year and family income band in the March CPS.<sup>1</sup> We control for a wide range of child, parental, and household characteristics that are common to the two datasets and apply the coefficients from these regression models to predict a value of income for each respondent in the December CPS-FSS by year and family income band. These controls include race/ethnicity, number of people in the household, presence of a child less than age 6, presence of an elderly person, child's nativity and citizenship status, parental nativity, marital status, education, employment status, and disability status, housing status, mother's age, food stamp receipt, and state of residence.

The second measure of poverty is what is commonly referred to as the supplemental poverty measure (SPM) based on the recommendations of the Interagency Technical Working Group on Developing a Supplemental Poverty Measure, established by the Office of Management and Budget's Chief Statistician. It is a somewhat modified version of the improved poverty measure recommended by the 1995 Panel of the National Academy of Sciences (see Hutto et al. (2011) for details). Using data from the Consumer Expenditure Survey, the

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<sup>1</sup>We also computed the median income of families in each income category in the March CPS and assigned that value to respondents in the corresponding income category in the December FSS. The results from preliminary logistic regressions, available upon request, indicate that the relationship between income to needs and food insecurity among children is very similar from the two specifications of income - median income and imputed income. We have elected to present results from the latter.

measure applies a new set of poverty thresholds based on expenditures on a basic bundle (comprising of food, shelter, clothing, and utilities) by two-child families within the 30-36<sup>th</sup> expenditure percentile. Further, we use data from March CPS, the Survey of Income and Program Participation (SIPP), and the Medical Expenditure Survey (MEPS) to create a more comprehensive measure of income that includes earnings, cash transfers, near-cash benefits, tax credits, and tax payments minus child care, work, and out-of-pocket medical expenses.<sup>2</sup> We use the same regression method for imputing continuous SPM income to needs ratio for the respondents in the December CPS-FSS as was used to predict income in the earlier analysis.

### *Analytic Strategy*

We first estimate a logistic regression model contrasting children who live in households reporting food insecurity among children with all others. Our baseline model is given by:

$$(1) Ch_{it} = \alpha_o + \alpha_I IP_{it} + \beta X_{it} + u_{it}$$

where  $Ch_{it}$  is an indicator for whether children in family  $i$  experienced food insecurity in year  $t$ , and is a function of  $IP_{it}$ , the income-to-needs ratio of family  $i$  in year  $t$ , and  $X_{it}$ , a vector of child and family characteristics, namely children's race and ethnicity (non-Hispanic white; non-Hispanic black; Hispanic origin; and others), the number of people in the household, the presence of a young child less than age six, the presence of an elderly person aged 65 and older, parents' nativity, marital status, educational attainment (no parent completed high school; at least one parent completed high school, no more; at least one parent completed some college, no B.A.;

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<sup>2</sup>The authors are grateful to Nathan Hutto for sharing SPM data. Further details on how SPM income and poverty are constructed are available in Hutto et al. (2011).

at least one parent has a Bachelor's degree or more), employment status (at least one parent employed full time [35 or more hours per week]; at least one parent is employed part time [less than 35 hours per week]; no employed parents), and disability, housing, mother's age (15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49 and 50–54, and 55 and older), state of residence, and year of survey. In this first step,  $IP_{it}$  represents income-to-needs ratio categories that are based on the official measure of poverty.

In order to assess whether income poverty based on the supplemental poverty measure correlates more closely with food insecurity among children than the official poverty index, our second step is to estimate the baseline model given by equation (1) using the SPM. Specifically, in these analyses,  $IP_{it}$  represents income-to-needs ratio categories based on the supplemental measure of poverty. The same procedure is used to examine very low food security among children—the second outcome of interest.

Next, we estimate a multinomial logistic regression model using detailed data on the level of food insecurity reported by families with children. We use the same baseline model, but here  $Ch_{it}$  is a multinomial outcome where families are assigned into one of the following categories: marginal food security among adults only; marginal food security among children; low food security among children; very low food security among children. Families reporting no food insecurity are the category of comparison. As in the logistic regression analysis described above, we estimate the multinomial model using income-to-needs ratio based on official poverty as well as the income-to-needs ratio based on the supplemental measure.<sup>3</sup>

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<sup>3</sup>In results not reported, we estimated an ordered logistic regression model. The results are similar to what is reported below.

Finally, as a robustness check, we exploit the longitudinal aspect of the CPS and estimate person fixed effects models to study the effect of a change in income between years  $t-1$  and  $t$  on food insecurity reported by families. This allows us to control for unobserved individual characteristics that may be associated both with being poor and experiencing food insecurity.<sup>4</sup>

The fixed effects models are estimated on a sample of children who were present at both the December ( $t$ ) and December ( $t+1$ ) surveys. The CPS interviews persons living within the same housing unit for four consecutive months, drops them from the survey for the next eight months, and re-enters them into the survey for the following four months. Thus families with a December interview that falls in months 1-4 will have a second interview the following December in months 5–8. We use a number of CPS public-use identifiers known to facilitate matching individuals across successive interviews, such as household identification number, the household number, and the person's line number (see e.g. Madrian and Lefgren(1999)). Because the CPS sampling frame is residences and not people, we also use the respondent's sex, race/ethnicity, nativity, state of residence, and period of arrival in the U.S. to match individuals in the December CPS of year  $t$  with individuals in the following December CPS of year  $t+1$ (Kaushal and Kaestner 2010). We are able to match about 60 percent of the respondents present in both waves across the two years. We also drop cases in which no income data were

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<sup>4</sup>One possible limitation of this approach is that attrition from the CPS sample may be positively correlated with the likelihood of being food insecure. Therefore, our estimate of the association between food insecurity and income to needs ratio may be biased because it does not include the experiences of a group who are at an increased risk of being food insecure. Previous research, however, suggests that person fixed effects lower bias from nonrandom attrition (Ziliak and Kniesner 1998).

available. Our sample for the person-fixed effects analysis is comprised of 58,364 unique persons (or 116,728 observations).<sup>5</sup>

## Results

Panel A in Table 1 displays the percentage of children by food security status of the household across four income-to-needs ratio categories based on the official and SPM measures of poverty. Panel B displays the distribution of children by food security status across the income-to-needs ratio categories. These panels underscore two main findings. First, there is a strong association between income to needs ratio and food insecurity among children regardless of how income is measured. Using the official measure of poverty, the rate of food insecurity is highest among children living in families with incomes below the poverty threshold and the risk of experiencing food insecurity decreases as income increases. For example, although 10.9 percent of all children live in households reporting food insecurity among children (with 9.9 percent in households with low food security among children and 1.0 percent in households reporting very low food security among children), more than one-quarter of children in officially poor families (27.5 percent) live in households with low or very low food security among children. (Among officially poor children about 25 percent of live in households with low food security among children and nearly three percent live in households with very low food security among children.) In addition, as displayed in Panel B, while overall about one in five children live in official poverty (20.4 percent), more than one-half (51.7 percent) of children in households with food insecurity among

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<sup>5</sup>To check if estimates in the longitudinal analysis were affected by differences in samples (cross-sectional versus longitudinal samples), we ran separate models using the two samples and found the estimated coefficients to be of similar magnitude.

children are poor and 62.3 percent of children in households with very low food security among children are poor, by official standards.

[Table 1 about here]

Second, Table 1 shows that the more comprehensive measure of poverty does a better job of identifying children in households with food hardship as poor. As shown in panel B, a larger share of children in households reporting food insecurity among children, both low and very low, are poor by the SPM measure than the official measure. We also find that about 16.9 percent of children in households with food insecurity among children (and 9.3 percent of children in households with very low food security among children) are in higher-income families (i.e., families with income greater than 200 percent of the poverty threshold) using the official measure compared to a much smaller share—6.2 and 3.3 percent, respectively—using the SPM measure. (Appendix Table A.2 includes the full set of descriptive statistics on child, parental, and household characteristics.)

The results from the regression analyses (presented in Tables 2 and 3) indicate that even after controlling for a rich set of covariates such as parents' education and employment, which are both highly correlated with income, there is a very strong relationship between income to needs ratio and food insecurity among children.

Table 2 presents results from a logistic regression model of food insecurity among children and very low food security among children. Each regression controls for race/ethnicity, number of people in the household, presence of a young child, presence of an older adult, parent's marital status, parental education, employment status, disability status, home ownership, mother's age, state of residence, and year of survey. (For results from models that do not include covariates, see Appendix Tables A.3 and A.4). The odds of experiencing food insecurity are



about 11 times greater among children in officially poor families compared with children in families with income at 300 percent or more of the official poverty threshold; the odds of experiencing very low food security are 12 times greater among children in officially poor families than among children in the higher income group. The results using the SPM measure of income are relatively the same with one exception: the effect of being at 200–299 percent of poverty on the likelihood of experiencing very low food security among children relative to being at 300 percent or more is no longer statistically significant.<sup>6</sup>

[Table 2 about here]

Table 3 presents results from a multinomial logistic regression with children who live in households with no reported food insecurity (i.e., fully food secure) as the comparison category. The odds ratios across each of the four food insecurity categories are greater for children in poor families than for children in families with income at 300 percent or more of the poverty

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<sup>6</sup>Betson (1996) argues that the equivalence scales, which are used to adjust the poverty thresholds for families of different size and composition, are inadequate as they do not fully take into consideration economies of scale nor do they adjust for differences in consumption patterns. Thus, in results not shown, very low food security among children was regressed on family income in deciles. The results from this logistic regression are consistent with what is reported in the paper. Income is strongly associated with very low food security among children. Controlling for a rich set of covariates including the number of young children, number of children aged 6–18, the number of adults, and number of elderly, children with family income in the 1st decile are 12 times as likely as children with family income in the 10th decile to be in a household with very low food security among children. The odds of experiencing very low food security decline as income increases.

threshold. In addition, when we refine the reference category and only include children in households who are fully food secure (i.e., households that do not respond affirmatively to any items in the food security module), we find the odds of experiencing very low food security among children becomes 26 times greater for children in officially poor families relative to children in the higher income category (300 percent or more than the poverty threshold). The corresponding estimated odds ratio is 22 in the regression using the SPM measure. (See Appendix Tables A.5 and A.6 for the full set of results.) Point estimates from the multinomial logistic regression also suggest that the association between poverty and food insecurity among children improves when moving from the official to the more comprehensive measure of income-to-needs ratio.

Table 4 presents results from models using person fixed-effects. Here we resort to ordinary least squares models because logit models are conditional on a family changing food security status between years  $t-1$  and  $t$ .<sup>7</sup> Panel A shows the relationship between income-to-needs and food insecurity using the categorical food security dependent variable that ranges from 1 "no food insecurity" to 5 "very low food security among children." Higher values indicate an increasing severity of household food insecurity. Panels B and C show results for the binary outcomes, food insecurity among children and very low food security among children, respectively. The coefficients for income-to-needs based on official income are presented in the first two columns. The last two columns present income-to-needs based on SPM income. Even after controlling for unobserved characteristics that may be correlated with both low income and food insecurity, we find that both the official and SPM measures of income-to-needs ratio

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<sup>7</sup> Respondents that do not change status between years  $t-1$  and  $t$  are dropped from the logit regression analysis.

are statistically significantly related to food insecurity (panels A and B). These results confirm that our findings are robust to time-invariant individual characteristics—as income-to-needs increases, the severity of food insecurity among children decreases. While we do not know with certainty in which direction the omitted variables might bias the results, we observe that the magnitude of the coefficients is reduced moving from the pooled OLS model (presented in Appendix A.7) to the fixed effects model, suggesting that poverty may be correlated with some unobserved factors that are also associated with food insecurity and that by controlling for person fixed effects, the relationship is weakened.

Panel C presents estimates of the association between very low food security among children and the income to needs ratios (divided by 100). Estimated coefficients are tiny and always statistically insignificant. A simple power analysis suggested that we do not have the sample sizes to estimate statistically significant effects (note that the mean of the dependent variable in our sample is 0.006). We have presented this analysis to be consistent with the earlier models.

[Table 4 about here]

## **Conclusion**

This paper examines the association between poverty and food insecurity among children using the official measure of poverty and the new supplemental poverty measure, which captures a more comprehensive set of resources and needs. The objective is to assess whether the association between food insecurity and poverty improves with a more inclusive measure. Very little work has explored the relationship between improved measures of poverty and experiences with food hardship, and what does exist is based on small, local-area samples that may not

necessarily be representative of the larger national population. We also utilize the longitudinal aspect of the CPS data to control for unobservable characteristics that may be correlated with both poverty and food insecurity. The results suggest two main findings.

First, we find evidence of a strong and statistically significant association between poverty and very low food security among children. This finding is consistent across both the official and SPM poverty measures. The incidence of food insecurity increases as income-to-needs ratio decreases. Further, the likelihood of being poor is significantly higher among those experiencing low and very low food security among children.

Second, point estimates suggest that using a more inclusive measure of income reveals a stronger association between poverty and food insecurity among children than the official measure. This finding appears to be robust to unobservable personal characteristics that may influence both income and food insecurity. Our results suggest that with SPM, the risk of experiencing food insecurity, particularly food insecurity among children, is strongly skewed toward children in lower-income families, which is what we would expect. We observe this in the bivariate analysis where a large majority of children in households reporting low and very low food security among children are officially poor and about 10 percent have family incomes at least 200 percent of poverty. However, when we move to the measure of SPM poverty, the share of children with high levels of family income in households reporting very low food security shrinks to three percent and the overwhelming majority (97 percent) is poor or low-income. The multivariate analyses reinforce this general finding.

Finally, this research demonstrates the importance of poverty measurement for understanding children's experiences with food hardship. The official poverty measure, which is based solely on cash income, does not include the value of the major benefit programs that assist

low-income families, such as the federal Earned Income Tax Credit, food stamps, Medicaid, and housing and child care assistance. The SPM measure allows one to examine how changes in benefit programs are related to food insecurity. Future work in this area should focus on how the components of SPM poverty contribute to defining more children who experience food insecurity as poor.

There are limitations to the study. While CPS-FSS is a rich source of data on food security, it does not contain information on detailed family characteristics, such as parents' mental and physical health, parents' health related behaviors, i.e., smoking, alcohol consumption, and illicit drug use, or parenting styles. In future research, we will explore additional data sources, such as the Fragile Families and Child Wellbeing Study (FFCWS) and the Early Childhood Longitudinal Studies, to examine the association between income and food insecurity taking advantage of more detailed information on children and their families currently missing from the literature.

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**Table 1. Children by Food Security Status, 2001-2009**

|   |         |                       |   |   | Food Insecurity among Children |  |  |
|---|---------|-----------------------|---|---|--------------------------------|--|--|
| Children<br>(by food security status of household)                    | Total   | No Food<br>Insecurity | Marginal<br>Food<br>Security<br>among<br>Adults | Marginal<br>Food<br>Security<br>among<br>Children | Total                          | Low<br>Food<br>Security<br>among<br>Children | Very<br>Low<br>Food<br>Security<br>among<br>Children |
| <b><u>Panel A: Percentage of Children by Food Security Status</u></b> |         |                       |   |   |                                |  |  |
| All children  | 100.0   | 65.6                  | 10.6  | 13.0  | 10.9                           | 9.9  | 1.0  |
| <u>Official Predicted Income</u>                                      |         |                       |   |   |                                |  |  |
| Income <100 % poverty threshold                                       | 100.0   | 30.8                  | 18.2  | 23.5  | 27.5                           | 24.6   | 2.9  |
| Income 100%-199% poverty threshold                                    | 100.0   | 47.6                  | 16.1  | 21.2  | 15.2                           | 14.1   | 1.2  |
| Income 200%-299% poverty threshold                                    | 100.0   | 73.0                  | 9.7   | 10.8  | 6.6                            | 6.2  | 0.3  |
| Income 300% or more of poverty threshold                              | 100.0   | 91.2                  | 3.8   | 3.6   | 1.5                            | 1.4  | 0.1  |
| <u>SPM Predicted Income</u>   |         |                       |   |   |                                |  |  |
| Income <100 % poverty threshold                                       | 100.0   | 33.9                  | 18.0  | 22.7  | 25.4                           | 22.7   | 2.7  |
| Income 100%-199% poverty threshold                                    | 100.0   | 60.3                  | 12.7  | 16.0  | 11.0                           | 10.2   | 0.8  |
| Income 200%-299% poverty threshold                                    | 100.0   | 84.8                  | 6.1   | 6.2   | 2.9                            | 2.8  | 0.1  |
| Income 300% or more of poverty threshold                              | 100.0   | 95.4                  | 1.9   | 2.1   | 0.7                            | 0.6  | 0.1  |
| <b><u>Panel B: Distribution of Children</u></b>                       |         |                       |   |   |                                |  |  |
| <u>Official Predicted Income</u>                                      | 100.0   | 100.0                 | 100.0   | 100.0   | 100.0                          | 100.0  | 100.0  |
| Income <100 % poverty threshold                                       | 20.4    | 9.6                   | 34.9  | 36.8  | 51.7                           | 50.6   | 62.3   |
| Income 100%-199% poverty threshold                                    | 23.2    | 16.8                  | 35.1  | 37.8  | 32.5                           | 32.9   | 28.5   |
| Income 200%-299% poverty threshold                                    | 17.7    | 19.7                  | 16.2  | 14.7  | 10.7                           | 11.1   | 6.1  |
| Income 300% or more of poverty threshold                              | 38.8    | 54.0                  | 13.8  | 10.7  | 5.2                            | 5.4  | 3.2  |
| <u>SPM Predicted Income</u>   | 100.0   | 100.0                 | 100.0   | 100.0   | 100.0                          | 100.0  | 100.0  |
| Income <100 % poverty threshold                                       | 23.9    | 12.4                  | 40.8  | 41.9  | 55.9                           | 54.9   | 67.0   |
| Income 100%-199% poverty threshold                                    | 37.5    | 34.5                  | 45.1  | 46.1  | 37.9                           | 38.7   | 29.8   |
| Income 200%-299% poverty threshold                                    | 18.4    | 23.7                  | 10.5  | 8.8   | 4.9                            | 5.2  | 2.1  |
| Income 300% or more of poverty threshold                              | 20.2    | 29.4                  | 3.6   | 3.2   | 1.3                            | 1.3  | 1.2  |
| N   | 234,113 | 158,160               | 24,440  | 27,665  | 23,848                         | 21,823                                       | 2,025  |

Note: "No Food Insecurity" includes children in households reporting no food insecure conditions; "Marginal Food Security among Adults, No Child Food Insecurity" includes children in households reporting at least one food insecure condition among adults, but none among children; "Marginal Food Security among Children" includes children in households reporting one food insecure condition among children; "Low Food Security among Children" includes children in households reporting between two and four food insecure conditions among children; "Very Low Food Security among Children" includes children in household reporting five or more food insecure conditions among children. Income-to-Needs ratio categories are based on predicted income.

Source: Authors' calculations of the 2001-2009 Current Population Survey, Food Security Supplement.

**Table 2. Coefficients and Odds Ratios from Logistic Regression of Food Insecurity among Children, 2001-2009 (Using Official and SPM Predicted Income)**

|                                    | Food Insecurity among Children |           |        |     | Very Low Food Security among Children |           |        |     |
|------------------------------------|--------------------------------|-----------|--------|-----|---------------------------------------|-----------|--------|-----|
|                                    | Est.                           | Robust SE | OR     |     | Est.                                  | Robust SE | OR     |     |
| <b>Official Predicted Income</b>   |                                |           |        |     |                                       |           |        |     |
| Income <100 % poverty threshold    | 2.422                          | .418      | 11.263 | *** | 2.478                                 | .144      | 11.921 | *** |
| Income 100%-199% poverty threshold | 2.018                          | .257      | 7.521  | *** | 1.898                                 | .136      | 6.671  | *** |
| Income 200%-299% poverty threshold | 1.250                          | .125      | 3.489  | *** | .863                                  | .151      | 2.371  | *** |
| <b>SPM Predicted Income</b>        |                                |           |        |     |                                       |           |        |     |
| Income <100 % poverty threshold    | 2.840                          | .061      | 17.122 | *** | 2.323                                 | .187      | 10.209 | *** |
| Income 100%-199% poverty threshold | 2.231                          | .059      | 9.306  | *** | 1.516                                 | .184      | 4.553  | *** |
| Income 200%-299% poverty threshold | 1.087                          | .063      | 2.965  | *** | -.033                                 | .230      | .968   |     |

Note: The estimates are based on regressions that control for race/ethnicity, number of people in the household, presence of a child less than age 6, presence of an adult aged 65 and older, parent is single, parental education, parental employment, parental disability, housing is rented, mother's age, state of residence, and year. See Appendix Tables A.3 and A.4 for the full set of results.

**Table 3. Coefficients and Odds Ratios from Multinomial Logistic Regression of Food Security among Children, 2001-2009 (Using Official and SPM Predicted Income)**

|                                    | Multinomial Logistic Regression                                     |      |        |     |   |      |        |     |  |      |        |     |   |      |        |     |
|------------------------------------|---|------|--------|-----|---|------|--------|-----|--|------|--------|-----|---|------|--------|-----|
|                                    | Marginal Food Security<br>among Adults<br>vs.<br>No Food Insecurity |      |        |     | Marginal Food Security<br>among Children<br>vs.<br>No Food Insecurity |      |        |     | Low Food Security among<br>Children<br>vs.<br>No Food Insecurity |      |        |     | Very Low Food Security<br>among Children<br>vs.<br>No Food Insecurity |      |        |     |
|                                    | Robust  |      |        |     | Robust  |      |        |     | Robust   |      |        |     | Robust  |      |        |     |
|                                    | Est.  | SE   | RRR    |     | Est.  | SE   | RRR    |     | Est.   | SE   | RRR    |     | Est.  | SE   | RRR    |     |
| Official Predicted Income          |   |      |        |     |   |      |        |     |  |      |        |     |   |      |        |     |
| Income <100 % poverty threshold    | 1.908   | .029 | 6.742  | *** | 2.533   | .031 | 12.587 | *** | 2.950  | .038 | 19.102 | *** | 3.244   | .140 | 25.631 | *** |
| Income 100%-199% poverty threshold | 1.648   | .025 | 5.198  | *** | 2.204   | .027 | 9.063  | *** | 2.407  | .035 | 11.097 | *** | 2.409   | .133 | 11.118 | *** |
| Income 200%-299% poverty threshold | .906  | .025 | 2.474  | *** | 1.239   | .028 | 3.454  | *** | 1.385  | .037 | 3.996  | *** | 1.011   | .150 | 2.748  | *** |
| SPM Predicted Income               |   |      |        |     |   |      |        |     |  |      |        |     |   |      |        |     |
| Income <100 % poverty threshold    | 2.380   | .041 | 10.805 | *** | 2.918   | .042 | 18.503 | *** | 3.400  | .063 | 29.950 | *** | 3.088   | .191 | 21.922 | *** |
| Income 100%-199% poverty threshold | 1.809   | .038 | 6.107  | *** | 2.181   | .039 | 8.859  | *** | 2.518  | .062 | 12.399 | *** | 1.845   | .186 | 6.328  | *** |
| Income 200%-299% poverty threshold | .962  | .041 | 2.618  | *** | .975  | .043 | 2.651  | *** | 1.168  | .066 | 3.216  | *** | -.037   | .230 | .964   |     |

Note: The estimates are based on regressions that control for race/ethnicity, number of people in the household, presence of a child less than age 6, presence of an adult aged 65 and older, parent is single, parental education, parental employment, parental disability, housing is rented, mother's age, state of residence, and year. See Appendix Tables A.5 and A.6 for the full set of results.

**Table 4. Coefficients from OLS Regression of Food Insecurity, 2001-2009**

|   | Children Matched in<br>Dec. (t) and Dec. (t+1) Samples<br>Person Fixed Effects |              |     |   |              |     |
|---|--|--------------|-----|---|--------------|-----|
|   | Income-to-Needs<br>Ratio Based on<br>Official Income                           |              |     | Income-to-Needs Ratio<br>Based on<br>SPM Income |              |     |
|   | Est.   | Robust<br>SE |     | Est.  | Robust<br>SE |     |
| <b>Panel A: Food Security Categorical Dependent Variable</b>                        |  |              |     |   |              |     |
| Income-to-needs ratio   | -.020  | .001         | *** | -.033   | .003         | *** |
| Mean of dependent variable  | 1.561  | 1.000        |     | 1.561   | 1.000        |     |
| <b>Panel B: Food Insecurity among Children<br/>Binary Dependent Variable</b>        |  |              |     |   |              |     |
| Income-to-needs ratio   | -.002  | .000         | *** | -.004   | .001         | *** |
| Mean of dependent variable  | .084   | .277         |     | .084  | .277         |     |
| <b>Panel C: Very Low Food Security among Children<br/>Binary Dependent Variable</b> |  |              |     |   |              |     |
| Income-to-needs ratio (divided by 100)  | .003   | .011         |     | -.003   | .020         |     |
| Mean of dependent variable  | .006   | .074         |     | .006  | .074         |     |
| Number of observations  | 116,728  |              |     | 116,728   |              |     |

\*p < .05 \*\*p < .01 \*\*\*p < .001

Note: The categorical food security dependent variable ranges from 1 "no food insecurity" to 5 "very low food security among children" with higher values indicating an increasing severity in the level of household food insecurity. Each regression controls for person fixed effects, number of people in the household, presence of a child less than age 6, presence of an adult aged 65 and older, parent is single, parental education, parental employment, parental disability, housing is rented, mother's age, and year fixed effects.

**Table A.1. 18 Questions for Measuring Food Security in the Food Security Supplement of the Current Population Survey.**

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- 1 "We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
  - 2 "The food that we bought just didn't last and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
  - 3 "We couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months?
  - 4 In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)
  - 5 (If yes to Question 4) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months?
  - 6 In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)
  - 7 In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No)
  - 8 In the last 12 months, did you lose weight because there wasn't enough money for food? (Yes/No)
  - 9 In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
  - 10 (If yes to Question 9) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months?
  - 11 "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
  - 12 "We couldn't feed our children a balanced meal, because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
  - 13 "The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months?
  - 14 In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (Yes/No)
  - 15 In the last 12 months, were the children ever hungry but you just couldn't afford more food? (Yes/No)
  - 16 In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No)
  - 17 (If yes to Question 16) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months?
  - 18 In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
-

**Table A.2. Rate of Food Insecurity among Children and Percentage Distribution of Children in Households Reporting Food Insecurity by Food Insecurity Status, 2001-2009**

| Children (by food security status of household)     | Food Insecurity among Children |          |                                     |          |                                       |          |         |          |                                  |          |                                       |          |
|---|--------------------------------|----------|-------------------------------------|----------|---------------------------------------|----------|---------|----------|----------------------------------|----------|---------------------------------------|----------|
|   | No Food Insecurity             |          | Marginal Food Security among Adults |          | Marginal Food Security among Children |          | Total   |          | Low Food Security among Children |          | Very Low Food Security among Children |          |
|   | %                              | Distrib. | %                                   | Distrib. | %                                     | Distrib. | %       | Distrib. | %                                | Distrib. | %                                     | Distrib. |
| <b><u>Sociodemographic Characteristics</u></b>      |                                |          |                                     |          |                                       |          |         |          |                                  |          |                                       |          |
| White   | 74.9                           | 67.2     | 8.4                                 | 46.7     | 10.2                                  | 46.0     | 6.5     | 35.5     | 6.1                              | 36.4     | 0.4                                   | 25.9     |
| Black   | 47.4                           | 10.4     | 15.0                                | 20.4     | 18.9                                  | 21.0     | 18.6    | 24.7     | 16.6                             | 24.1     | 2.0                                   | 30.0     |
| Other   | 68.6                           | 7.3      | 9.7                                 | 6.4      | 11.5                                  | 6.2      | 10.2    | 6.6      | 9.3                              | 6.6      | 0.9                                   | 6.6      |
| Hispanic  | 50.1                           | 15.2     | 14.1                                | 26.5     | 17.6                                  | 26.9     | 18.2    | 33.3     | 16.4                             | 32.9     | 1.8                                   | 37.5     |
| Two people in the household                         | 53.0                           | 3.6      | 15.0                                | 6.2      | 16.6                                  | 5.7      | 15.4    | 6.3      | 13.9                             | 6.2      | 1.5                                   | 6.8      |
| Three people in the household                       | 67.0                           | 19.3     | 11.3                                | 20.1     | 11.3                                  | 16.5     | 10.4    | 18.2     | 9.6                              | 18.3     | 0.9                                   | 17.8     |
| Four people in the household                        | 71.8                           | 38.4     | 9.4                                 | 31.0     | 10.7                                  | 29.0     | 8.1     | 26.1     | 7.4                              | 26.4     | 0.6                                   | 23.7     |
| Five or more people in the household                | 61.0                           | 38.7     | 10.9                                | 42.7     | 15.3                                  | 48.9     | 12.9    | 49.4     | 11.7                             | 49.2     | 1.2                                   | 51.8     |
| No children less than aged 6 present                | 65.8                           | 66.5     | 9.6                                 | 59.9     | 13.2                                  | 67.3     | 11.4    | 69.8     | 10.3                             | 69.2     | 1.1                                   | 76.8     |
| Child less than aged 6 present                      | 65.1                           | 33.5     | 12.6                                | 40.1     | 12.6                                  | 32.7     | 9.7     | 30.2     | 9.1                              | 30.9     | 0.7                                   | 23.2     |
| No person aged 65 or older present                  | 65.6                           | 96.3     | 10.6                                | 96.0     | 13.0                                  | 96.1     | 10.8    | 96.0     | 9.9                              | 96.0     | 1.0                                   | 96.2     |
| Person aged 65 or older present                     | 64.3                           | 3.7      | 11.1                                | 4.0      | 13.3                                  | 3.9      | 11.3    | 4.0      | 10.3                             | 4.0      | 1.0                                   | 3.8      |
| Parents born in the U.S.                            | 67.3                           | 79.5     | 10.4                                | 75.8     | 12.7                                  | 75.6     | 9.6     | 68.8     | 8.9                              | 69.3     | 0.8                                   | 63.7     |
| At least one parent born outside the US             | 59.6                           | 20.5     | 11.4                                | 24.2     | 14.0                                  | 24.4     | 15.0    | 31.2     | 13.5                             | 30.7     | 1.5                                   | 36.3     |
| Single parent                                       | 46.2                           | 20.3     | 15.1                                | 41.2     | 19.2                                  | 42.7     | 19.5    | 51.7     | 17.5                             | 51.0     | 1.9                                   | 58.4     |
| Married parents                                     | 73.4                           | 79.7     | 8.8                                 | 58.9     | 10.5                                  | 57.3     | 7.4     | 48.3     | 6.8                              | 49.0     | 0.6                                   | 41.6     |
| Neither parent completed high school                | 37.7                           | 6.7      | 16.6                                | 18.4     | 21.0                                  | 19.0     | 24.7    | 26.6     | 22.4                             | 26.5     | 2.3                                   | 27.9     |
| At least one parent completed high school, no more  | 52.3                           | 19.7     | 14.5                                | 33.7     | 18.0                                  | 34.3     | 15.2    | 34.5     | 13.8                             | 34.3     | 1.4                                   | 35.9     |
| At least one parent completed some college, no B.A. | 68.1                           | 39.8     | 10.3                                | 37.3     | 12.4                                  | 36.6     | 9.1     | 32.3     | 8.3                              | 32.2     | 0.8                                   | 32.5     |
| At least one parent has Bachelor's degree or more   | 87.5                           | 33.8     | 4.4                                 | 10.6     | 5.3                                   | 10.2     | 2.9     | 6.7      | 2.7                              | 6.9      | 0.1                                   | 3.8      |
| At least one parent employed FT (35+ hours)         | 71.6                           | 88.4     | 9.1                                 | 69.4     | 11.2                                  | 70.0     | 8.1     | 60.3     | 7.5                              | 61.1     | 0.6                                   | 51.9     |
| At least one parent employed PT (<35 hours), no FT  | 46.2                           | 4.4      | 16.1                                | 9.5      | 19.5                                  | 9.4      | 18.2    | 10.5     | 16.1                             | 10.2     | 2.1                                   | 13.6     |
| No employed parents                                 | 36.9                           | 7.2      | 17.4                                | 21.1     | 20.9                                  | 20.6     | 24.8    | 29.2     | 22.2                             | 28.7     | 2.6                                   | 34.6     |
| No disabled parents                                 | 67.0                           | 97.9     | 10.4                                | 93.7     | 12.7                                  | 93.4     | 10.1    | 88.9     | 9.2                              | 89.3     | 0.8                                   | 84.3     |
| At least one parent is disabled                     | 33.1                           | 2.1      | 16.4                                | 6.3      | 20.9                                  | 6.6      | 29.6    | 11.2     | 26.0                             | 10.7     | 3.7                                   | 15.7     |
| Housing is rented or occupied without payment       | 42.8                           | 20.9     | 16.6                                | 49.9     | 20.1                                  | 49.5     | 20.5    | 60.4     | 18.4                             | 59.2     | 2.2                                   | 72.0     |
| Housing is owned by household member                | 76.3                           | 79.1     | 7.8                                 | 50.1     | 9.6                                   | 50.5     | 6.3     | 39.7     | 5.9                              | 40.8     | 0.4                                   | 28.0     |
| N   | 234,113                        | 158,160  | 234,113                             | 24,440   | 234,113                               | 27,665   | 234,113 | 23,848   | 234,113                          | 21,826   | 234,113                               | 2,025    |

Note: Estimates of food insecurity are based on 1995-2009 CPS FSS and excludes cases with missing information on family income reported in the FSS. Sample sizes are unweighted; percentages are weighted using the appropriate supplement weight. The table does not include information on mother's age, year of survey, and state of residence.



**Table A.3. Coefficients and Odds Ratios from Logistic Regression of Food Insecurity among Children, 2001-2009**

|   | Official Predicted Income |      |            |        |         |            |    | SPM Predicted Income |      |            |         |      |            |      |
|---|---------------------------|------|------------|--------|---------|------------|----|----------------------|------|------------|---------|------|------------|------|
|   | Model 1                   |      |            |        | Model 2 |            |    | Model 1              |      |            | Model 2 |      |            |      |
|   | Robust                    |      |            | Est.   | Robust  |            |    | Robust               |      |            | Robust  |      |            | Est. |
|   | Est.                      | SE   | OR         |        | Est.    | SE         | OR | Est.                 | SE   | OR         | Est.    | SE   | OR         |      |
| Income <100% poverty threshold                      | 3.245                     | .030 | 25.673 *** | 2.422  | .418    | 11.263 *** |    | 3.842                | .057 | 46.667 *** | 2.840   | .061 | 17.122 *** |      |
| Income 100%-199% poverty threshold                  | 2.519                     | .034 | 12.421 *** | 2.018  | .257    | 7.521 ***  |    | 2.833                | .057 | 17.005 *** | 2.231   | .059 | 9.306 ***  |      |
| Income 200%-299% poverty threshold                  | 1.520                     | .028 | 4.571 ***  | 1.250  | .125    | 3.489 ***  |    | 1.392                | .063 | 4.025 ***  | 1.087   | .063 | 2.965 ***  |      |
| Black   |                           |      |            | .256   | .031    | 1.292 ***  |    |                      |      |            | .242    | .024 | 1.273 ***  |      |
| Other   |                           |      |            | .189   | .042    | 1.208 ***  |    |                      |      |            | .199    | .034 | 1.221 ***  |      |
| Hispanic  |                           |      |            | .206   | .030    | 1.229 ***  |    |                      |      |            | .228    | .024 | 1.257 ***  |      |
| Number of people                                    |                           |      |            | .052   | .005    | 1.054 ***  |    |                      |      |            | .120    | .005 | 1.128 ***  |      |
| Child <6 present                                    |                           |      |            | -.205  | .015    | .814 ***   |    |                      |      |            | -.195   | .018 | .823 ***   |      |
| Person aged 65+ present                             |                           |      |            | -.262  | .031    | .770 ***   |    |                      |      |            | .040    | .043 | 1.040      |      |
| At least one parent foreign born                    |                           |      |            | .138   | .025    | 1.148 ***  |    |                      |      |            | .167    | .022 | 1.182 ***  |      |
| Single  |                           |      |            | .431   | .028    | 1.538 ***  |    |                      |      |            | .684    | .018 | 1.981 ***  |      |
| Neither parent completed high school                |                           |      |            | .661   | .067    | 1.938 ***  |    |                      |      |            | .686    | .035 | 1.986 ***  |      |
| At least one parent completed high school, no more  |                           |      |            | .577   | .056    | 1.781 ***  |    |                      |      |            | .621    | .031 | 1.862 ***  |      |
| At least one parent has some college-no BA, no more |                           |      |            | .564   | .053    | 1.757 ***  |    |                      |      |            | .563    | .030 | 1.755 ***  |      |
| At least one parent employed PT (<35 hours), no FT  |                           |      |            | .059   | .028    | 1.061 *    |    |                      |      |            | .131    | .026 | 1.140 ***  |      |
| No employed parents                                 |                           |      |            | .148   | .025    | 1.159 ***  |    |                      |      |            | .129    | .022 | 1.138 ***  |      |
| At least one parent is disabled                     |                           |      |            | .567   | .052    | 1.763 ***  |    |                      |      |            | .682    | .030 | 1.977 ***  |      |
| Housing is rented                                   |                           |      |            | .405   | .027    | 1.499 ***  |    |                      |      |            | .427    | .018 | 1.533 ***  |      |
| Year 2002   |                           |      |            | .069   | .032    | 1.072 *    |    |                      |      |            | .067    | .030 | 1.069 *    |      |
| Year 2003   |                           |      |            | .096   | .033    | 1.101 **   |    |                      |      |            | .105    | .030 | 1.110 ***  |      |
| Year 2004   |                           |      |            | .077   | .033    | 1.080 *    |    |                      |      |            | .120    | .030 | 1.128 ***  |      |
| Year 2005   |                           |      |            | -.036  | .030    | .964       |    |                      |      |            | -.009   | .031 | .991       |      |
| Year 2006   |                           |      |            | -.003  | .032    | .997       |    |                      |      |            | .022    | .032 | 1.022      |      |
| Year 2007   |                           |      |            | -.021  | .034    | .980       |    |                      |      |            | .025    | .035 | 1.025      |      |
| Year 2008   |                           |      |            | .290   | .041    | 1.336 ***  |    |                      |      |            | .228    | .031 | 1.256 ***  |      |
| Year 2009   |                           |      |            | .237   | .039    | 1.268 ***  |    |                      |      |            | .215    | .031 | 1.239 ***  |      |
| Intercept   | -4.248                    | .030 | ***        | -5.292 | .070    | ***        |    | -4.967               | .056 | ***        | -6.307  | .084 | ***        |      |
| N   | 234113                    |      |            | 234113 |         |            |    | 234113               |      |            | 234113  |      |            |      |

\*p < .05 \*\*p < .01 \*\*\*p < .001

Note: Family income 300% or more of poverty threshold, White, Married, College (BA) degree or more, At least one parent employed FT (35+ hours), Mother aged 50-54, NY state, and Year 2001 are omitted categories. Coefficients for mother's age and state of residence in Model 2 are not shown.

**Table A.4. Coefficients and Odds Ratios from Logistic Regression of Very Low Food Security among Children, 2001-2009**

|   | Official Predicted Income |      |            |         |      |            | SPM Predicted Income |      |            |         |      |            |
|---|---------------------------|------|------------|---------|------|------------|----------------------|------|------------|---------|------|------------|
|   | Model 1                   |      |            | Model 2 |      |            | Model 1              |      |            | Model 2 |      |            |
|   | Robust                    |      |            | Robust  |      |            | Robust               |      |            | Robust  |      |            |
|   | Est.                      | SE   | OR         | Est.    | SE   | OR         | Est.                 | SE   | OR         | Est.    | SE   | OR         |
| Income <100% poverty threshold                      | 3.574                     | .118 | 35.641 *** | 2.478   | .144 | 11.921 *** | 3.605                | .176 | 36.806 *** | 2.323   | .187 | 10.209 *** |
| Income 100%-199% poverty threshold                  | 2.589                     | .122 | 13.321 *** | 1.898   | .136 | 6.671 ***  | 2.320                | .179 | 10.178 *** | 1.516   | .184 | 4.553 ***  |
| Income 200%-299% poverty threshold                  | 1.234                     | .146 | 3.434 ***  | .863    | .151 | 2.371 ***  | .386                 | .228 | 1.471      | -.033   | .230 | .968       |
| Black   |                           |      |            | .456    | .070 | 1.578 ***  |                      |      |            | .437    | .070 | 1.548 ***  |
| Other   |                           |      |            | .132    | .106 | 1.141      |                      |      |            | .145    | .106 | 1.156      |
| Hispanic  |                           |      |            | .199    | .072 | 1.220 **   |                      |      |            | .214    | .075 | 1.239 **   |
| Number of people                                    |                           |      |            | .098    | .013 | 1.103 ***  |                      |      |            | .161    | .013 | 1.174 ***  |
| Child <6 present                                    |                           |      |            | -.386   | .059 | .680 ***   |                      |      |            | -.373   | .061 | .688 ***   |
| Person aged 65+ present                             |                           |      |            | -.239   | .122 | .787       |                      |      |            | .024    | .122 | 1.024      |
| At least one parent foreign born                    |                           |      |            | .348    | .063 | 1.416 ***  |                      |      |            | .369    | .064 | 1.446 ***  |
| Single  |                           |      |            | .648    | .058 | 1.912 ***  |                      |      |            | .903    | .056 | 2.467 ***  |
| Neither parent completed high school                |                           |      |            | .830    | .137 | 2.294 ***  |                      |      |            | .881    | .132 | 2.414 ***  |
| At least one parent completed high school, no more  |                           |      |            | .937    | .130 | 2.551 ***  |                      |      |            | 1.008   | .126 | 2.739 ***  |
| At least one parent has some college-no BA, no more |                           |      |            | 1.018   | .126 | 2.767 ***  |                      |      |            | 1.047   | .125 | 2.850 ***  |
| At least one parent employed PT (<35 hours), no FT  |                           |      |            | .146    | .075 | 1.157      |                      |      |            | .213    | .075 | 1.237 **   |
| No employed parents                                 |                           |      |            | .154    | .062 | 1.166 *    |                      |      |            | .129    | .063 | 1.138 *    |
| At least one parent is disabled                     |                           |      |            | .529    | .076 | 1.697 ***  |                      |      |            | .629    | .075 | 1.876 ***  |
| Housing is rented                                   |                           |      |            | .650    | .059 | 1.915 ***  |                      |      |            | .667    | .057 | 1.948 ***  |
| Year 2002   |                           |      |            | .052    | .100 | 1.053      |                      |      |            | .040    | .101 | 1.040      |
| Year 2003   |                           |      |            | -.208   | .110 | .812       |                      |      |            | -.201   | .100 | .818       |
| Year 2004   |                           |      |            | .084    | .101 | 1.088      |                      |      |            | .115    | .110 | 1.122      |
| Year 2005   |                           |      |            | .223    | .100 | 1.249 *    |                      |      |            | .238    | .101 | 1.269 *    |
| Year 2006   |                           |      |            | -.123   | .110 | .884       |                      |      |            | -.108   | .100 | .898       |
| Year 2007   |                           |      |            | .257    | .109 | 1.292 *    |                      |      |            | .300    | .110 | 1.350 **   |
| Year 2008   |                           |      |            | .756    | .092 | 2.129 ***  |                      |      |            | .680    | .109 | 1.973 ***  |
| Year 2009   |                           |      |            | .607    | .093 | 1.835 ***  |                      |      |            | .581    | .092 | 1.788 ***  |
| Intercept   | -7.104                    | .115 | ***        | -8.425  | .220 | ***        | -7.264               | .174 | ***        | -8.857  | .255 | ***        |
| N   | 234113                    |      |            | 234113  |      |            | 234113               |      |            | 234113  |      |            |

\*p < .05 \*\*p < .01 \*\*\*p < .001

Note: Family income 300% or more of poverty threshold, White, Married, College (BA) degree or more, At least one parent employed FT (35+ hours), Mother aged 50-54, NY state, and Year 2001 are omitted categories. Coefficients for mother's age and state of residence in Model 2 are not shown.

**Table A.5. Coefficients and Odds Ratios from Multinomial Logistic Regression of Food Insecurity, 2001-2009 (Using Official Predicted Income)**

|   | Marginal Food Security<br>among Adults<br>vs. No Food Insecurity |      |           | Marginal Food Security<br>among Children<br>vs. No Food Insecurity |      |            | Low Food Security among<br>Children<br>vs. No Food Insecurity |      |            | Very Low Food Security<br>among Children<br>vs. No Food Insecurity |      |            |
|---|--|------|-----------|--|------|------------|---|------|------------|--|------|------------|
|   | Robust   |      |           | Robust   |      |            | Robust  |      |            | Robust   |      |            |
|   | Est.   | SE   | RRR       | Est.   | SE   | RRR        | Est.  | SE   | RRR        | Est.   | SE   | RRR        |
| Income <100% poverty threshold            | 1.908  | .029 | 6.742 *** | 2.533  | .030 | 12.587 *** | 2.950   | .037 | 19.102 *** | 3.244  | .131 | 25.631 *** |
| Income 100%-199% poverty threshold        | 1.648  | .025 | 5.198 *** | 2.204  | .027 | 9.063 ***  | 2.407   | .035 | 11.097 *** | 2.409  | .133 | 11.118 *** |
| Income 200%-299% poverty threshold        | .906   | .025 | 2.474 *** | 1.239  | .028 | 3.454 ***  | 1.385   | .037 | 3.996 ***  | 1.011  | .150 | 2.748 ***  |
| Black                                     | .239   | .026 | 1.270 *** | .263   | .026 | 1.300 ***  | .363  | .027 | 1.438 ***  | .645   | .071 | 1.906 ***  |
| Other                                     | .126   | .035 | 1.135 *** | .052   | .035 | 1.053      | .235  | .037 | 1.265 ***  | .220   | .107 | 1.246 *    |
| Hispanic                                  | .187   | .025 | 1.205 *** | .145   | .025 | 1.156 ***  | .277  | .027 | 1.320 ***  | .321   | .073 | 1.379 ***  |
| Number of people                          | -.021  | .006 | .979 ***  | .065   | .005 | 1.067 ***  | .060  | .005 | 1.062 ***  | .125   | .013 | 1.133 ***  |
| Child <6 present                          | -.005  | .018 | .995      | -.220  | .018 | .803 ***   | -.244   | .020 | .784 ***   | -.489  | .060 | .613 ***   |
| Person aged 65+ present                   | -.056  | .041 | .945      | -.338  | .042 | .714 ***   | -.357   | .044 | .700 ***   | -.413  | .124 | .662 **    |
| At least one parent foreign born          | -.134  | .024 | .874 ***  | -.149  | .024 | .862 ***   | .044  | .024 | 1.045      | .298   | .064 | 1.348 ***  |
| Single                                    | .211   | .019 | 1.235 *** | .361   | .019 | 1.434 ***  | .536  | .020 | 1.709 ***  | .883   | .058 | 2.418 ***  |
| Neither parent completed high school      | .531   | .033 | 1.701 *** | .501   | .032 | 1.650 ***  | .804  | .037 | 2.235 ***  | 1.112  | .135 | 3.039 ***  |
| One parent completed high school, no more | .553   | .027 | 1.739 *** | .516   | .026 | 1.676 ***  | .708  | .033 | 2.030 ***  | 1.189  | .128 | 3.283 ***  |
| One parent has some college, no BA        | .458   | .024 | 1.581 *** | .436   | .024 | 1.546 ***  | .644  | .031 | 1.905 ***  | 1.218  | .124 | 3.381 ***  |
| One parent employed PT (<35 hours), no FT | .119   | .028 | 1.127 *** | .124   | .028 | 1.132 ***  | .112  | .030 | 1.118 ***  | .219   | .076 | 1.245 **   |
| No employed parents                       | .117   | .024 | 1.124 *** | .087   | .024 | 1.091 ***  | .206  | .025 | 1.229 ***  | .258   | .063 | 1.294 ***  |
| At least one parent is disabled           | .500   | .037 | 1.648 *** | .533   | .036 | 1.704 ***  | .824  | .035 | 2.280 ***  | .990   | .078 | 2.692 ***  |
| Housing is rented                         | .422   | .018 | 1.525 *** | .429   | .018 | 1.536 ***  | .568  | .019 | 1.765 ***  | .931   | .058 | 2.538 ***  |
| Year 2002                                 | -.119  | .029 | .888 ***  | .016   | .031 | 1.017      | .051  | .033 | 1.052      | .050   | .101 | 1.051      |
| Year 2003                                 | -.102  | .030 | .903 **   | -.023  | .032 | .978       | .090  | .033 | 1.095 **   | -.207  | .111 | .813       |
| Year 2004                                 | -.021  | .029 | .980      | .051   | .032 | 1.053      | .085  | .033 | 1.089 *    | .114   | .102 | 1.121      |
| Year 2005                                 | -.091  | .030 | .913 **   | -.089  | .032 | .915 **    | -.091   | .034 | .913 **    | .174   | .101 | 1.190      |
| Year 2006                                 | -.108  | .031 | .897 ***  | -.067  | .033 | .935 *     | -.027   | .034 | .973       | -.157  | .111 | .855       |
| Year 2007                                 | -.694  | .052 | .500 ***  | 2.396  | .029 | 10.976 *** | .929  | .037 | 2.531 ***  | 1.317  | .110 | 3.733 ***  |
| Year 2008                                 | .378   | .030 | 1.460 *** | .182   | .034 | 1.200 ***  | .368  | .034 | 1.445 ***  | .955   | .093 | 2.598 ***  |
| Year 2009                                 | .429   | .029 | 1.535 *** | .280   | .033 | 1.323 ***  | .362  | .034 | 1.437 ***  | .832   | .094 | 2.299 ***  |
| Intercept                                 | -3.785   | .066 | ***       | -4.842   | .068 | ***        | -5.703  | .076 | ***        | -9.156   | .228 | ***        |
| N   | 234113   |      |           | 234113   |      |            | 234113  |      |            | 234113   |      |            |

\*p < .05 \*\*p < .01 \*\*\*p < .001

Note: Income 300% or more of poverty threshold, White, Married, College degree or more, At least one parent employed FT (35+ hours), Mother aged 50-54, NY state, and Year 2001 are omitted categories. Coefficients for mother's age and state of residence fixed effects are not shown.

**Table A.6. Coefficients and Odds Ratios from Multinomial Logistic Regression of Food Insecurity, 2001-2009 (Using SPM Predicted Income)**

|   | Marginal Food Security<br>among Adults<br>vs. No Food Insecurity |      |            |  | Marginal Food Security<br>among Children<br>vs. No Food Insecurity |      |            |  | Low Food Security among<br>Children<br>vs. No Food Insecurity |      |            |  | Very Low Food Security<br>among Children<br>vs. No Food Insecurity |      |            |  |
|---|--|------|------------|--|--|------|------------|--|---|------|------------|--|--|------|------------|--|
|   | Robust   |      |            |  | Robust   |      |            |  | Robust  |      |            |  | Robust   |      |            |  |
|   | Est.   | SE   | RRR        |  | Est.   | SE   | RRR        |  | Est.  | SE   | RRR        |  | Est.   | SE   | RRR        |  |
| Income <100% poverty threshold            | 2.380  | .040 | 10.805 *** |  | 2.918  | .041 | 18.503 *** |  | 3.400   | .063 | 29.950 *** |  | 3.088  | .185 | 21.922 *** |  |
| Income 100%-199% poverty threshold        | 1.809  | .038 | 6.107 ***  |  | 2.181  | .039 | 8.859 ***  |  | 2.518   | .062 | 12.399 *** |  | 1.845  | .186 | 6.328 ***  |  |
| Income 200%-299% poverty threshold        | .962   | .041 | 2.618 ***  |  | .975   | .043 | 2.651 ***  |  | 1.168   | .066 | 3.216 ***  |  | -.037  | .230 | .964       |  |
| Black                                     | .215   | .025 | 1.240 ***  |  | .237   | .025 | 1.267 ***  |  | .338  | .027 | 1.402 ***  |  | .606   | .071 | 1.833 ***  |  |
| Other                                     | .134   | .035 | 1.144 ***  |  | .065   | .035 | 1.067      |  | .247  | .037 | 1.280 ***  |  | .232   | .107 | 1.261 *    |  |
| Hispanic                                  | .204   | .025 | 1.226 ***  |  | .171   | .025 | 1.187 ***  |  | .306  | .027 | 1.358 ***  |  | .346   | .073 | 1.413 ***  |  |
| Number of people                          | .057   | .005 | 1.058 ***  |  | .163   | .005 | 1.177 ***  |  | .166  | .005 | 1.181 ***  |  | .247   | .014 | 1.281 ***  |  |
| Child <6 present                          | .006   | .018 | 1.006      |  | -.208  | .018 | .812 ***   |  | -.228   | .020 | .797 ***   |  | -.468  | .060 | .626 ***   |  |
| Person aged 65+ present                   | .246   | .042 | 1.278 ***  |  | .076   | .042 | 1.079      |  | .077  | .046 | 1.080      |  | .063   | .126 | 1.065      |  |
| At least one parent foreign born          | -.112  | .024 | .894 ***   |  | -.119  | .024 | .888 ***   |  | .080  | .024 | 1.083 **   |  | .331   | .064 | 1.393 ***  |  |
| Single                                    | .464   | .019 | 1.590 ***  |  | .691   | .018 | 1.995 ***  |  | .906  | .020 | 2.476 ***  |  | 1.327  | .058 | 3.769 ***  |  |
| Neither parent completed high school      | .493   | .033 | 1.637 ***  |  | .489   | .032 | 1.630 ***  |  | .820  | .037 | 2.270 ***  |  | 1.144  | .135 | 3.139 ***  |  |
| One parent completed high school, no more | .529   | .026 | 1.697 ***  |  | .533   | .026 | 1.705 ***  |  | .745  | .032 | 2.107 ***  |  | 1.246  | .126 | 3.478 ***  |  |
| One parent has some college, no BA        | .392   | .024 | 1.481 ***  |  | .401   | .024 | 1.493 ***  |  | .621  | .031 | 1.862 ***  |  | 1.209  | .124 | 3.352 ***  |  |
| One parent employed PT (<35 hours), no FT | .198   | .028 | 1.219 ***  |  | .211   | .028 | 1.235 ***  |  | .222  | .030 | 1.249 ***  |  | .341   | .076 | 1.406 ***  |  |
| No employed parents                       | .099   | .024 | 1.104 ***  |  | .045   | .024 | 1.046      |  | .180  | .025 | 1.197 ***  |  | .217   | .063 | 1.242 **   |  |
| At least one parent is disabled           | .610   | .036 | 1.840 ***  |  | .679   | .036 | 1.973 ***  |  | .990  | .035 | 2.691 ***  |  | 1.181  | .078 | 3.258 ***  |  |
| Housing is rented                         | .436   | .018 | 1.546 ***  |  | .443   | .018 | 1.557 ***  |  | .589  | .019 | 1.802 ***  |  | .944   | .059 | 2.571 ***  |  |
| Year 2002                                 | -.112  | .029 | .894 ***   |  | .019   | .031 | 1.019      |  | .049  | .032 | 1.050      |  | .038   | .101 | 1.039      |  |
| Year 2003                                 | -.094  | .030 | .910 **    |  | -.009  | .032 | .991       |  | .104  | .033 | 1.110 **   |  | -.194  | .111 | .824       |  |
| Year 2004                                 | .029   | .029 | 1.029      |  | .119   | .031 | 1.126 ***  |  | .153  | .033 | 1.166 ***  |  | .181   | .102 | 1.199      |  |
| Year 2005                                 | -.054  | .030 | .947       |  | -.039  | .032 | .961       |  | -.043   | .034 | .958       |  | .216   | .101 | 1.241 *    |  |
| Year 2006                                 | -.077  | .031 | .926 *     |  | -.022  | .033 | .978       |  | .016  | .034 | 1.016      |  | -.117  | .111 | .890       |  |
| Year 2007                                 | -.675  | .052 | .509 ***   |  | 2.422  | .029 | 11.269 *** |  | .958  | .038 | 2.606 ***  |  | 1.359  | .110 | 3.893 ***  |  |
| Year 2008                                 | .308   | .029 | 1.360 ***  |  | .100   | .033 | 1.105 **   |  | .278  | .034 | 1.320 ***  |  | .836   | .093 | 2.306 ***  |  |
| Year 2009                                 | .389   | .029 | 1.475 ***  |  | .241   | .033 | 1.272 ***  |  | .324  | .034 | 1.382 ***  |  | .786   | .094 | 2.196 ***  |  |
| Intercept                                 | -4.755   | .071 | ***        |  | -5.910   | .073 | ***        |  | -6.982  | .091 | ***        |  | -9.955   | .261 | ***        |  |
| N   | 234113   |      |            |  | 234113   |      |            |  | 234113  |      |            |  | 234113   |      |            |  |

\*p < .05 \*\*p < .01 \*\*\*p < .001

Note: Income 300% or more of poverty threshold, White, Married, College degree or more, At least one parent employed FT (35+ hours), Mother aged 50-54, NY state, and Year 2001 are omitted categories. Coefficients for mother's age and state of residence fixed effects are not shown.

**Table A.7. Coefficients from OLS Regression of Food Insecurity, 2001-2009**

|   | Total Sample of Children |          |         |          | Children Matched in Dec. (t) and Dec. (t+1) Samples |          |         |          | Children Matched in Dec. (t) and Dec. (t+1) Samples Person Fixed Effects |          |         |          |
|---|--------------------------|----------|---------|----------|---|----------|---------|----------|--|----------|---------|----------|
|   | Model 1                  |          | Model 2 |          | Model 1   |          | Model 2 |          | Model 1  |          | Model 2 |          |
|   | Robust                   |          | Robust  |          | Robust  |          | Robust  |          | Robust   |          | Robust  |          |
|   | Est.                     | SE       | Est.    | SE       | Est.  | SE       | Est.    | SE       | Est.   | SE       | Est.    | SE       |
| Income-to-needs ratio (official income)             | -.073                    | .001 *** |         |          | -.067   | .001 *** |         |          | -.020  | .001 *** |         |          |
| Income-to-needs ratio (SPM income)                  |                          |          | -.122   | .001 *** |   |          | -.113   | .001 *** |  |          | -.033   | .003 *** |
| Black   | .164                     | .006 *** | .156    | .008 *** | .153  | .013 *** | .145    | .012 *** |  |          |         |          |
| Other   | .055                     | .008 *** | .054    | .009 *** | .053  | .013 *** | .050    | .013 *** |  |          |         |          |
| Hispanic  | .124                     | .006 *** | .123    | .007 *** | .110  | .011 *** | .109    | .011 *** |  |          |         |          |
| Number of people                                    | .050                     | .001 *** | .065    | .002 *** | .052  | .002 *** | .067    | .002 *** | .011   | .010     | .016    | .010     |
| Child <6 present                                    | -.065                    | .004 *** | -.065   | .005 *** | -.056   | .007 *** | -.056   | .006 *** | .001   | .018     | .002    | .018     |
| Person aged 65+ present                             | -.139                    | .009 *** | -.089   | .012 *** | -.129   | .016 *** | -.083   | .016 *** | -.080  | .049     | -.066   | .049     |
| At least one parent foreign born                    | .035                     | .005 *** | .034    | .006 *** | .046  | .009 *** | .046    | .009 *** |  |          |         |          |
| Single  | .241                     | .005 *** | .289    | .006 *** | .259  | .009 *** | .304    | .009 *** | .126   | .034 *** | .138    | .034 *** |
| Neither parent completed high school                | .321                     | .007 *** | .307    | .010 *** | .327  | .015 *** | .312    | .015 *** | -.029  | .058     | -.029   | .058     |
| At least one parent completed high school, no more  | .206                     | .004 *** | .205    | .006 *** | .202  | .008 *** | .199    | .008 *** | -.015  | .034     | -.013   | .034     |
| At least one parent has some college-no BA, no more | .096                     | .003 *** | .096    | .004 *** | .101  | .005 *** | .100    | .005 *** | .003   | .024     | .004    | .024     |
| At least one parent employed PT (<35 hours), no FT  | .169                     | .008 *** | .171    | .010 *** | .177  | .014 *** | .179    | .014 *** | .078   | .021 *** | .079    | .021 *** |
| No employed parents                                 | .200                     | .007 *** | .187    | .009 *** | .233  | .014 *** | .221    | .014 *** | .127   | .024 *** | .125    | .024 *** |
| At least one parent is disabled                     | .416                     | .011 *** | .424    | .014 *** | .447  | .020 *** | .455    | .020 *** | .083   | .037 *   | .086    | .037 *   |
| Housing is rented                                   | .332                     | .004 *** | .321    | .006 *** | .330  | .009 *** | .319    | .009 *** | .077   | .024 **  | .074    | .024 **  |
| Intercept   | 1.152                    | .017 *** | 1.085   | .017 *** | 1.184   | .023 *** | 1.117   | .023 *** | 1.602  | .065 *** | 1.582   | .065 *** |
| Mean of dependent variable                          | 1.655                    | 1.061    | 1.655   | 1.061    | 1.561   | 1.000    | 1.561   | 1.000    | 1.561  | 1.000    | 1.561   | 1.000    |
| Number of observations                              | 234,113                  |          | 234,113 |          | 116,728   |          | 116,728 |          | 116,728  |          | 116,728 |          |

\*p < .05 \*\*p < .01 \*\*\*p < .001

Note: The categorical food security dependent variable ranges from 1 "no food insecurity" to 5 "very low food security among children" with higher values indicating an increasing severity in the level of household food insecurity. White, married, college (BA) degree or more, at least one parent employed FT (35+ hours), mother aged 50-54, NY state, and year 2001 are omitted categories.